

Remarks

Applicants thank the Examiner for carefully considering the subject application. Applicants submit the present amendment along with a Request for Continued Examination, and therefore request that this amendment be entered.

New claim 31

Applicants have cancelled the original claims and presented a new set of claims. Support for the new claims can be found throughout the specification and figures, including, for example, Figures 32, 33-34, 49-53, and 54, along with the corresponding description. In particular, Figure 54 describes several different example starts where different cylinders are set to different strokes at different engine positions, as well as where the same cylinder is set to different strokes at different positions.

Returning to the new claims, Claim 31 claims:

A method for starting an internal combustion engine with electrically actuated valves, the method comprising;

 during engine starter motor cranking of a first start, setting valve timing of a first electrically actuated valve of a first cylinder to generate a selected stroke in said first cylinder, where said first valve is set at a first engine position and where a remainder of cylinders in the engine are set so that the engine performs sequential combustion starting with said first cylinder; and

 during engine starter motor cranking of a second start, setting valve timing of a second electrically actuated valve of a second cylinder to generate said selected stroke in said second cylinder, where said second valve is set at a second engine position different from said first engine position and where the remainder of cylinders in the engine are set so that the engine performs sequential combustion starting with said second cylinder.

In this way, different engine cylinders can be set to a selected stroke even when the engine is started from different positions, and thus faster engine starting can be achieved. Further, there is no need to change combustion order of the cylinders since sequential

combustion is utilized right from the start.

Unlike the approach of claim 31, each of the applied references admittedly takes a different approach. As asserted by the Examiner, the approach of Tisch et al. utilizes two cylinders having common orbits which are set to the same stroke. Thus, Tisch et al. fail to utilize sequential combustion as claimed. Likewise, Brueggen et al. also take a different approach. As asserted by the Examiner, Brueggen et al. operate without the aid of a starter motor. Finally, none of the cited references recognize the advantages that can be obtained by operating as in claim 31.

New claim 40

Regarding new claim 40, it claims:

A method for starting an internal combustion engine with electrically actuated valves, the method comprising;

during engine starter motor cranking of a first start, setting an electrically actuated valve of a first cylinder to generate a selected stroke, where said valve is set at a first engine position in which a piston of said first cylinder is after top dead center but before bottom dead center or before top dead center but after bottom dead center; and

during engine starter motor cranking of a second start, setting an electrically actuated valve of a second cylinder to generate said selected stroke, where said valve is set at a second engine position in which a piston of said second cylinder is after top dead center but before bottom dead center or before top dead center but after bottom dead center, where said first engine position is different from said second engine position.

Again, as discussed above, different engine cylinders can be set to a selected stroke even when the engine is started from different positions, and thus faster engine starting can be achieved. Further, a broad range of engine positions is available at which the stroke can be set so that the engine is not required to move to a single specified location (such as top dead center) and thus again fast engine starting can be achieved.

Unlike the approach of claim 31, each of the applied references admittedly takes a different approach. As asserted by the Examiner, the approach of Tisch et al. sets cylinders in a common orbit to an intake stroke at top dead center. Thus, Tisch et al. fail to set any cylinder strokes at different engine position as claimed. Likewise, Brueggen et al. also take a different approach. As asserted by the Examiner, Brueggen et al. operate without the aid of a starter motor. Finally, none of the cited references recognize the advantages that can be obtained by operating as in claim 31. The above arguments also apply to claim 52.

New claim 46

Regarding new claim 46, it claims:

A method for starting an internal combustion engine with electrically actuated valves, the method comprising;

during engine starter motor cranking of a first start, setting an electrically actuated valve of a cylinder to generate a first stroke, where said valve is set at a first piston position before top dead center but after bottom dead center of said cylinder; and

during engine starter motor cranking of a second start, setting said valve to generate a second stroke, different from said first stroke, where said valve is set at a second piston position after top dead center but before bottom dead center of said cylinder.

Again, as discussed above, an engine cylinder can be set to different strokes at different positions, and thus faster engine starting can be achieved since the cylinder stroke is tailored to different positions. Further, the stroke can be set at a position where there is sufficient time to move valves to a desired position so that the selected stroke can be performed. Further still, a broad range of engine positions is available at which the different strokes can be set so that the engine is not required to move to a single specified location (such as top dead center) and thus again fast engine starting can be achieved.

Unlike the approach of claim 46, each of the applied references admittedly takes a different approach. As asserted by the Examiner, the approach of Tisch et al. sets cylinders in a common orbit to an intake stroke at top dead center. Thus, Tisch et al. fail to set any cylinder strokes at different engine position as claimed. Likewise, Brueggen et al. also take a different approach. As asserted by the Examiner, Brueggen et al. operate without the aid of a starter motor. Finally, none of the cited references recognize the advantages that can be obtained by operating as in claim 46.

Conclusion

Based on the foregoing comments, the above-identified application is believed to be in condition for allowance, and such allowance is courteously solicited. If any further amendment is necessary to advance prosecution and place this case in allowable condition, the Examiner is courteously requested to contact the undersigned by fax or telephone at the number listed below.

Please charge any cost incurred in the filing of this Amendment, along with any other costs, to Deposit Account No. 06-1510. If there are insufficient funds in this account, please charge the fees to Deposit Account No. 06-1505.

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450, on September 1, 2005.



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